Matti Hallikainen

Developing Work Safety Policy

For Vocational Educational Program in Logistics

Helsinki Metropolia University of Applied Sciences

Master's Degree

Industrial Management

Master's Thesis

2 May 2017

Helsinki Metropolia University of Applied Sciences

Finishing this thesis feels like ending a demanding academic journey. The courses in Metropolia have required a great deal of motivation and determination to finish the studies on time. The Master's program has been challenging but also rewarding in terms of personal and professional growth.

Completing this thesis would not have been possible without the professional help of Dr Juha Haimala and comprehensive assistance of PhL Zinaida Grabovskaia who have assisted me through this demanding journey by motivating, supporting and challenging me to perform better. Special thank you goes also to Dr Thomas Rohweder who has provided most insightful comments and improvement suggestions along the thesis process.

I also want to thank my employer for providing the opportunity to participate in the Master's program. A special thank you goes to the key stakeholders of our organization for providing insight and feedback in the thesis process.

Finally, I would like to thank our group which has participated in the writing clinics and gate presentations and provided support, suggestions and team spirit to complete this project. Everyone in our group has participated in making this journey a memory for all of us.

Matti Hallikainen
Helsinki
May 2, 2017

Author(s) Title Number of Pages Date	Matti Hallikainen Developing Work Safety Policy 56 pages + 4 appendices 2 May 2017
Degree	Master of Engineering
Degree Programme	Master's Program in Logistics
Instructors	Dr. Juha Haimala, Principal Lecturer, Head of Department of Industrial Management Zinaida Grabovskaia, PhL, Senior Lecturer

The objective of this thesis is to establish a pre-plan for the development of a work safety policy in secondary level logistics education. The case organization operates in safety critical environment without a work safety policy. A work safety policy is a systematic way to address the challenges which are involved in the operational activities of a safety critical organization.

The objective of this thesis is approached by identifying the key challenges of the case organization by determining the current state of the operations. The sources of data include stakeholder interviews, internal documents and observations. The inclusion of key stakeholders, internal documents and observations provide a thorough understanding of the current state of the operations. The current state analysis illustrates the key findings which are chosen as development priorities. Existing knowledge from academic and practitioner literatures is then examined and utilized to formulate a conceptual framework which provides instruments for building the proposal.

The outcome of this thesis is a pre-plan for the development of work safety policy which provides managerial suggestions and operational guidelines for the case organization. The pre-plan includes guidelines, procedures and roles and responsibilities of key stakeholders. The pre-plan was co-created with key stakeholders from case organization and work safety authority. By implementing the pre-plan, the organization is able to improve work safety by establishing a Safety Culture and implementing Safety Management into organizational activities and operational procedures.

Keywords	Work safety, education

Contents

List of Tables

1 Introduction

This study focuses on developing a work safety policy for a secondary level vocational education program in logistics. Current attention on work safety is insufficient as educational organizations do not necessarily have systematic methods to manage risks that are in existence in daily operations. It also concerns the educational activities which take place in the organization's premises. Therefore, it is of importance to develop a relevant work safety policy to manage the existing risks and evaluating correct means and procedures to improve the current situation with work safety in vocational education.

1.1 Key Concepts

Presently, secondary level logistics education is executed in vocational schools with a duration of three years in order to become qualified for a certain profession in logistics. These professions include operators of various industrial vehicles such as vans, trucks and busses as well as operators of forklifts, heavy equipment and machinery. Secondary level education focuses on teaching practical skills required to practice a profession and therefore educational content is based on tasks where different skills are practiced in real life situations at vocational school premises or at various related work sites. Therefore, it is necessary to create a work safety policy in order to insure safe work procedures and methods in the daily educational operations of the vocational school.

Risks can occur at all times when inexperienced students practice skills and tasks that are required in various logistics professions mentioned above. For example, professional training includes driving and operating logistics equipment as well as maintenance of service shop equipment such as hydraulic and pneumatic tools and- power tools, all of which possess danger to health and safety concerning both students and instructors. By creating a work safety policy, these risks can be reduced or even eliminated, this creating a safer working environment for all members of the educational organization.

1.2 Case Organization Background

The case organization of this thesis is Vantaa Vocational College Varia, a vocational education organization which offers several vocational degrees. The case organization is located in the city of Vantaa in southern Finland. Logistics education is executed in facilities located at Aviapolis area in the vicinity of Helsinki-Vantaa airport, which makes of the training companies and customers of Varia.

The number of students entering the logistics education program has increased during the past five years. Over 130 students began their logistics studies in 2016, whereas the total number of logistics students is over 300.

Duration of the logistics education program is three years, during which the student undergoes various logistics courses both theoretical and practical. The theoretical courses include theoretical aspects of logistics, mathematics, native and foreign languages as well as optional courses of these topics. The practical courses enhance the professional skills required to operate and maintain logistics equipment and machinery as well as various skills required in the operations of a logistics company.

1.3 Business Challenge

Currently, a work safety policy does not exist as such in Vantaa Vocational College Varia, even though safety issues have been discussed and evaluated on various occasions when planning and implementing educational work. Therefore, it is of importance to commence development and evaluation process via this study in order to develop uniform work safety procedures for all operations where safety issues are involved.

The lack of safety policy can lead to severe consequences in case of an accident. If an accident occurs, all and foreseen safety measures are evaluated and examined in terms of adequateness and dimension. These measures also include responsibilities of various members of the organization who are responsible for the safe operation of the organization. Firstly, the lack of sufficient work safety policy can lead to severe accidents endangering the health of students and instructors. Secondly, the consequences of an accident result in legal acts concerning neglected safety measures. Finally, these negative misfortunes lead to immeasurably severe impacts on the successful operation

of the organization. Therefore, these negative scenarios need to be reduced or anticipated, and the safety policy should help in this task.

1.4 Objective and Scope

The objective of this thesis is to establish a pre-plan for the development of a work safety policy in secondary level logistics education. In order to execute this study, it is necessary to evaluate the aspects that must be considered for a successful establishment of a work safety policy for the logistics education in Vantaa Vocational College Varia. The requirements of work safety on secondary level logistics education are analyzed as well as the required extent for a successful accomplishment of the work safety policy. By acting in this manner, a sufficient standard of measures and procedures is determined in order to successfully develop a work safety policy.

In order to accomplish a pre plan for the development of a work safety policy it is necessary to determine the requirements of safety matters concerning all operations that possess potential risks which require attention. Current knowledge and experience are gathered from the existing work safety policies which operate as sources of information. The body of knowledge in this study comes from existing work safety policies that have been executed and administered in comparable organizations in terms of work procedures, processes and measures.

The scope of this study is in developing the pre-plan in such form that it can be implemented as such in Vantaa Vocational College Varia in existing premises with existing personnel resources which includes creating the necessary structures and basis needed to ensure sufficient level of work safety in Vantaa Vocational College Varia. The outcome of the thesis is a table which includes the responsibility areas of all members of the organization and measures that are required to establish and develop the work safety policy.

This Thesis is written in six sections. Section 1 is the Introduction. Section 2 overviews research approach and research design to suggest how the study is executed. Section 3 analyzes current state of case organization to evaluate current strengths and improvement areas. Section 4 discusses conceptual framework in order to establish existing knowledge on the subject. Section 5 represents the proposal based on the findings of current state analysis and conceptual framework. Section 6 validates the proposal.

2 Method and Material

This section describes the research approach of the thesis. This section also overviews the data collection and analysis methods to tackle the business challenge.

2.1 Research Approach

The research approach of this thesis is a qualitative case study. Case study can be regarded as a description and an analysis of a phenomena where an assortment of methods and techniques are used to examine complex real life occurrences where boundaries between phenomenon and context are not clear. (Merriam 2009: 3-29) This requires a collection of data as well as interpreting phenomena where sequences occur as a consequence to one another.

According to Yin (2009), case study is a linear and iterative process where each stage contains one step. These steps are planning, designing, preparing, collecting, analysing and sharing. Firstly, the research question is identified. Secondly, the type and source of data are selected. Finally, the analysis of the results is reported to the audience. By acting in this manner, a pre-specified action plan is created. Evaluation and re-examination of the previous steps are used in case study process to insure reliable and valid research. It is crucial to report all evidence in order to avoid misleading and delusive results and conclusions. (Yin 2009: 19-37) It is also necessary to identify key informants in order to determine which instances are competent to answer the research questions. (Meeta 2015, 151-156)

In this thesis, the qualitative case study is used to find answers to questions of how to improve the current work safety procedures by creating a pre plan for the creation of a work safety policy. Firstly, the current state of the case organization is determined by examining data from key stakeholders in order to find out which improvement areas will be discussed. Secondly, existing knowledge of information is selected from valid and relevant sources in conceptual framework to identify key elements of work safety. Thirdly, a proposal is created based on the findings of current state analysis and conceptual framework. Finally, the proposal is validated based on key stakeholder information.

2.2 Research Design

In order to execute this study, it is necessary to evaluate the aspects that must be considered for a successful establishment of a work safety policy for the logistics education in Vantaa Vocational College Varia. The requirements of work safety on secondary level logistics education are analyzed as well as the required extent for a successful accomplishment of the work safety policy. By acting in this manner, a sufficient standard of measures and procedures is determined in order to successfully accomplish a work safety policy.

The research design for this thesis is illustrated in Table 1. The research design consists of five stages which proceed as follows: objective, conceptual framework, current state analysis, proposal development and validation of the proposal.

Table 1. Research design of this study.

Step	Content	Outcome	Data
Research objective	A pre plan for the creation of a work safety policy	Research strategy	
Current State Analysis (CSA)	Analysis of the current organization; training environment Analysis of improvement areas Legislative guidelines Key findings	Focus areas for Safety policy	Data Collection 1 • Interviews with teachers, management and safety authorities. • Observations of current organizational practices. • Benchmarking best practice examples.
Conceptual Framework	Reviewing existing knowledge on organizational work safety policies	Conceptual Framework, including: Key elements identified from Safety regulations	
Proposal development	Creating Proposal (based on CSA, Conceptual Framework and stakeholder inputs)	Initial proposal	Data Collection 2 • Interview with work safety authority • Interviews with stakeholders of the organization.
Validation of the proposal	Validating Proposal (based on stakeholder feedback)	Final proposal	Data Collection 3 Validation of the proposal by work safety authority audition.

As seen from Table 1, the research design starts with specifying the business challenge and setting the objective. The objective of this study is to establish a pre-plan for the development of work safety policy for Vantaa Vocational College Varia. The current state analysis includes all the current procedures concerning work safety in terms of what is being done, where, how and by whom. Information is gathered from key stakeholders to find out the strengths and weaknesses of the current state of the organization and which areas are to be improved. These results also determines the search for best practice and available knowledge and later shapes the outcome of the proposal, as the CSA findings are evaluated and appropriate measures are taken based on these findings and displayed in the proposal.

Next, the conceptual framework includes all the existing information and best practice examples related to work safety policy concepts in comparable contexts. Based on the results from CSA and findings from literature, the proposal is developed and tailored to suit the case organization. The outcome of the proposal is a process matrix for work safety policy which determines the roles and responsibilities of various members of the organization to ensure safe work procedures throughout the organization. In the last stage, the proposal is finally validated by using an authorised work safety authority.

2.3 Data Collection and Analysis

In this study, data was collected from three different sources. Data is collected by using interviews, observations and exploring work safety related documents which are analyzed in order to address the objective. Therefore, the data is non-numerical as the scope of this thesis is to develop a work safety policy which is based on experiences, practices and knowledge concerning the subject.

Data Collection 1 focuses on the current state analysis in Section 3. It included interviews, observations and documents to analyze the current state of work safety in Vantaa Vocational College Varia and determine the current challenges, strengths and weaknesses of the organization. This also includes gathering best practice from existing work safety policies including a variety of work safety related studies, guides and documentation that was gathered and analyzed from literature in order to perceive best practice in the subject in comparable contexts for conceptual framework.

Data Collection 2 was done to concentrate on proposal development in Section 5. The development included all the requirements that were essential in developing a relevant and adequate proposal suited for case company Vantaa Vocational College Varia. The requirements were examined by creating an open group discussion involving an official work safety authority as well as the management of the organization in order to assure a thorough approach involving both the organizational details as well as the requirements of the work safety laws and regulations.

Data Collection 3 was focused on validation of the proposal by gathering feedback and suggestions for the initial proposal. The information and ideas were gathered in an open group discussion involving the work safety authority and organization's management. By acting in this manner the work safety authority was used to audit and evaluate the adequacy of the initial proposal for providing sufficient information in order to validate the proposal.

Data 1 was collected during November and December of 2016. Table 2 below shows details of Data Collection 1.

Table 2. Data Collection 1.

	Type of data collection	Participant	Date and duration	Documentation	Analysis
1	Interview	Organizational administrative manager	1.12.2016 60 min	Field notes	Thematic content analysis of qualitative data. Results of analysis are described in Section 3, Current state analysis
2	Interview	Logistics teacher 1	28.11.2016 15 min	Field notes	
3	Interview	Logistics teacher 2	13.12.2016 20 min	Field notes	
4	Observation of a video tape	First year logistics students	8.9.2016 10 min	Field notes	
5	Group discussion	All first year logistics teachers	19.12.2016 30 min	Field notes	
6	Internal documents	Organizational administrative manager and head of department	26.1.2017 45 min	Field notes	

As seen from Table 2, interviewing and observations were used to gather data from current practices and procedures concerning current state analysis. The names of the informants are not included in Table 2 in order to secure confidentiality of students and employees. The interviews were conducted face-to-face in arranged meetings and documented in field notes. Observations were done by inspecting a surveillance camera video tape material concerning a work safety related occurrence. The focus of the data collection was to find out the current established safety procedures and challenges related to them.

Data Collection 2 took place on December and January of 2017. Table 3 below shows details of Data Collection 2.

Table 3. Data Collection 2.

	Type of data collection	Participants	Date and duration	Documentation	Analysis
1	Group Discussion	Organizational administrative manager, Head of logistics education and a work safety authority	12.12.2016 240 min	Field notes	Thematic content analysis of qualitative data. Results of analysis are described in Section 5, Development of Proposal
2	Group discussion	Organizational administrative manager, Head of logistics education and a work safety authority	23.1.2017 240 min	Field notes	

As shown in Table 3, Data Collection 2 consisted of a group discussion involving the administrative manager of the organization, head of logistics department as well as a representative of work safety authority. The focus of the discussion was to gather information and ideas on how to create a process matrix which includes all the necessary measures and procedures that must be taken in case organization. The group discussion was performed as an informal discussion and the information was gathered as field notes upon the findings of the discussion.

Data Collection 3 was accomplished during February and March of 2017. Table 4 below shows details of Data collection 3.

Table 4. Data Collection 3.

	Type of data collection	Participants	Date and duration	Documentation	Analysis
1	Group discussion	Organizational administrative manager, Head of logistics education and a work safety authority	12.2.2016 240 min	Field notes	Section 6, Validation of the proposal
2	Group discussion	Organizational administrative manager, Head of logistics education and a work safety authority	23.3.2016 240 min	Field notes	Section 6, Validation of the proposal

As shown in Table 4, Data Collection 3 consisted of two group discussions involving both the organizational administrative manager and the head of logistics education as well as the work safety authority. The focus of these discussions was to gather feedback and to use the work safety authority for auditing and evaluating the relevance of the proposal. The group discussions were performed as informal discussions and the information was gathered as field notes upon the findings of the discussions.

As typical of a qualitative case study, the methods of data collection used in this thesis was thematic content analysis of qualitative data.

3 Current State Analysis of Health and Safety in Case Organization

This section presents and discusses current practices and state of health and safety in Vantaa Vocational College Varia. The current state analysis is based on interviews, video recorded data and group discussions concerning the logistics education as presented in Section 2.

3.1 Overview of the CSA Stage

The current state analysis is used to analyze the current situation concerning health and safety in Vantaa Vocational College Varia. The current state analysis is separated into sub-steps which are as follows.

First, the analysis starts by looking into *the current organizational context and structure* (in Section 3.2) to establish the factors which influence the current operational risks. Organizational structure also includes key stakeholders, their roles and responsibilities, and the operational and administrative activities, and possible locations.

Secondly, the analysis continues by looking into *the current activities and health and safety measures* of the case organization (in Section 3.3). It mainly relates to the safety challenges, as identified based on the results of Data Collection 1. The current work safety related activities are separated into three sub-categories which include: (a) internal activities concerning the in-house teaching (presented in Section 3.3.1), (b) external activities involving partner organizations (discussed in Section 3.3.2), and (c) safety records, work safety related incidents of the past, as well as safety challenges (analyzed in Section 3.3.3). Analysis of current safety challenges is presented in Section 3.4 based on Data Collection 1, and relate to the organizational structure and its current operational activities and safety challenges.

Thirdly, *legislative guidelines* are discussed (in Section 3.5). This analysis focuses on all the rules, regulations and recommendations which concern the activities of the case organization and the secondary vocational educational setting in general.

Finally, key findings are presented in Section 3.6 based on Data Collection 1, and relate to the organizational structure and its current operational activities and safety challenges.

Thus, the current state of the case organization's health and safety is determined and moreover, where the problem areas are recognized for future consideration. These findings will be used for directing the search for the body of knowledge (and building the conceptual framework, in Section 4) and also for proposal building, in Section 5.

3.2 Structure of the Case Organization

To establish the roles in the current organizational structure, as well as *relate them to the current operational risks*, this section start with describing the current organization structure. The current administrative structure of the case organization is illustrated in Figure 1 below.

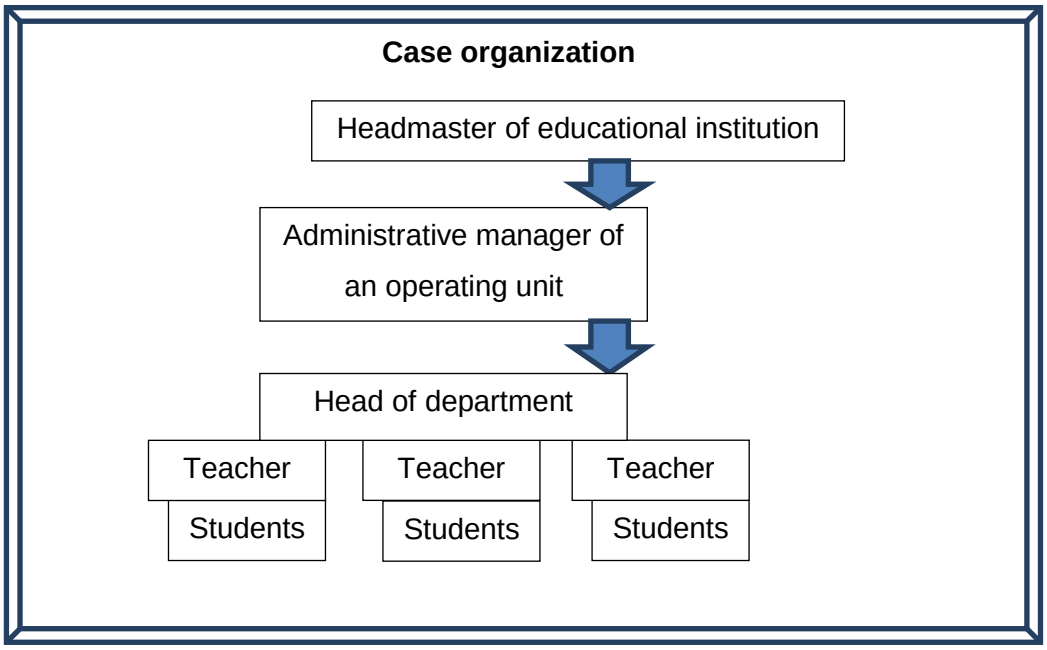

Figure 1. Administrative structure of the case organization.

As seen from Figure 1, the Headmaster is the executive administrative manager of the case organization. Each operating unit also has its own Administrative manager who is in charge of the strategy and leadership of operations in this unit. Each operating unit is divided into departments according to their particular fields of education such as logistics education. Teachers work under the supervision of the Head of department who has the managerial responsibility of the department and its teachers and all daily activities. Teacher is the direct superior of students who receive their instructions and guidance from the teacher.

Based on the results of the interview with the Administrative manager, currently, the responsibility for safety matters of each operating unit is based on the actions of its Administrative manager. This involves the planning and execution of all safety related procedures and matters that are taken in the operating unit. Previously, each department did not have an assigned Head of department and therefore, the Administrative manager was the direct superior of all employees in the various departments of the operating unit. Therefore, previously, the Administrative manager did not have possibilities to supervise work and operate as a superior who is present where the work is done and provide managerial support to the Teachers.

During the academic year of 2015-2016, a new model was established in the case organization shown in Figure 3 above. As a result, the managerial responsibility was divided by creating a Head of department position for each department. By acting in this manner, the Administrative manager has Head of departments as subordinates, hence making them the direct superiors of the Teachers of their department. Importantly, in the new organizational structure, the roles and responsibilities of each member are not yet specified in an official manner or recorded anywhere.

De facto, as an executive organizational manager, the Headmaster is responsible for all actions and activities of the educational institute, whereas each administrative manager is in charge of one's operating unit. As such, the Head of department operates as the executor of tasks and orders addressed by the Administrative manager. These tasks and orders include managerial duties involving the operations and activities concerning the educational procedures, planning, preparation and development of the department.

Based on the results of the interview with the Head of department (Respondent 7), currently, the managerial situation within the logistics department has improved during academic year 2016-2017 as a result of the new organizational structure. Presently, managing staff is done in a direct and assisted manner. This approach also improves the abilities to develop the current procedures concerning activities and procedures in the daily operations. For example, managing of the staff is done in weekly meetings within the department, with the time period of two hours reserved for it. The meetings are held by the head of department with the occasional visit by the administrative manager. The meetings are used to inform teachers about acute situations which concern educative activities, changes, work safety and other miscellaneous matters. In addition

to the weekly meetings, each annual study year includes five additional collaboration days which are reserved for development and providing additional education for the teachers as well as planning. However, two of these days are accomplished uniformly for all operating units and their departments without concentrating on the needs of individual departments which differ from each other in size, location, competence profile, educational branch and educational requirements. Therefore, the usefulness of the uniform collaboration days is questionable albeit demanded by the Headmaster.

Guidelines for administrative and organizational management come from the Headmaster. These guidelines include all administrative and operational activities in all operating units regardless of the individual requirements of these units and the departments which they represent. The guidelines instruct how the educative activities are to be planned and executed even though the requirements differ considerably between different operating units and their departments due to the large variety of education which is provided by the case organization.

3.3 Operational Processes

This section includes the operational processes of the case organization including internal activities, external activities and work safety related incidents, safety records and safety challenges.

3.3.1 Internal Activities

Logistics education program consists of approximately 125-150 new students entering the three year program each August with no previous experience in logistics. The program begins with orientation to work safety during the first two weeks when students are familiarized with the working procedures, various equipment, premises and tools which are utilized throughout the various courses. Each student also receives personal safety equipment such as safety shoes, overalls, gloves and a reflective vest. Additional work gear includes protective eye wear, ear protectors and other special equipment which is handed out for individual tasks. Work safety orientation is not accomplished with any given material. Each Teacher provides one's own orientation based on the competence profile of the teacher.

Moreover, certain students have very limited skills concerning Finnish language and therefore the safety orientation is facing problems where the non-Finnish speaking students do not understand the content of the orientation and therefore act against instructions. All students that apply for studies in the logistics program are approved for studying regardless of their background and existing abilities to work and communicate in Finnish language.

The practical part includes tasks where students are supposed to operate heavy equipment in a controlled environment in a closed proving area where driving licenses are not required. Currently, the practicing occurs after the Teacher is assured of a sufficient level of knowledge and skill obtained by the student. However, the sufficient amount of knowledge is not based on a particular means of measuring these skills and knowledge hence relying on the judgment of an individual teacher.

The practical part also includes maintenance of the equipment with power tools and hand tools as well as the usage of various oils, greases and chemicals required in these tasks. The first year studies also include various qualifications such as an occupational safety card, hot work permit, first aid card, roadwork safety training and hygiene passport which are all accomplished during the first year as a part of the logistics curriculum in no particular order.

The structure of the three year curriculum is illustrated in Table 5 below.

Table 5. Structure of the logistics curriculum.

	Study year	Type of studies	Qualifications
1	First year	Operation and maintenance of heavy equipment	Occupational safety card, hot work permit, first aid card, roadwork safety training, hygiene passport
2	Second year	Driving practice, operation of vehicle mounted equipment. Work orientation period of eight weeks	Category B and category C driving licenses
3	Third year, truck	Driving practice, opera-	Category C+E driving license

	driver program	tion of vehicle mounted equipment. Work orientation period of eight weeks	
4	Third year, bus driver program	Driving practice, operation of vehicle mounted equipment. Work orientation period of eight weeks	Category D driving license
5	Third year, airport ground service program	Airport ground service training. Work orientation period of eight weeks	Permits to work at the airport

As seen from Table 5, the first and the second year are similar for all students in terms of content. The first year logistics studies comprises of theoretical studies involving courses in automotive technology, hydraulics, pneumatics, electronics, various tools and heavy equipment such as earth moving machinery and forklifts. Second and third year concentrate on performing the driving licenses for corresponding vehicle categories as well as completing the various logistics courses which are required by the Finnish National Agency for Education.

Second year studies focus on various driving licenses that can be obtained in the logistics education program. These licenses include category B car driving license and category C truck driving license during the second year. In addition to the driving lessons themselves, the vehicles have a large number of different mechanisms and features such as a truck-mounted cranes and other lifting devices as well as hook or cable operated roll-off equipment. The driver of the vehicle is often required to use this equipment at work and therefore it is essential that the students practice these skills during their second year studies in order to gain sufficient skills and knowledge to operate the equipment properly and safely after graduation.

On the third year the student specializes either in category C+E license for articulated trucks towing a trailer or category D license for busses and hence graduate either as a truck or bus driver. The third year studies include driving lessons as well as courses to

practice manoeuvring and operating vehicles in category C+E or category D in a similar fashion as in the second year studies. Alternatively, it is also possible to proceed into airport ground services program on the third year where students graduate with category C driving license and have additional competences for airport ground handling with abilities to operate the equipment used at the airport ground handling services. The airport ground handling services program only includes theoretical studies where students are familiarized with airport processes and safety measures in classroom.

The general educational process common for all curriculums is illustrated in Figure 2 below.

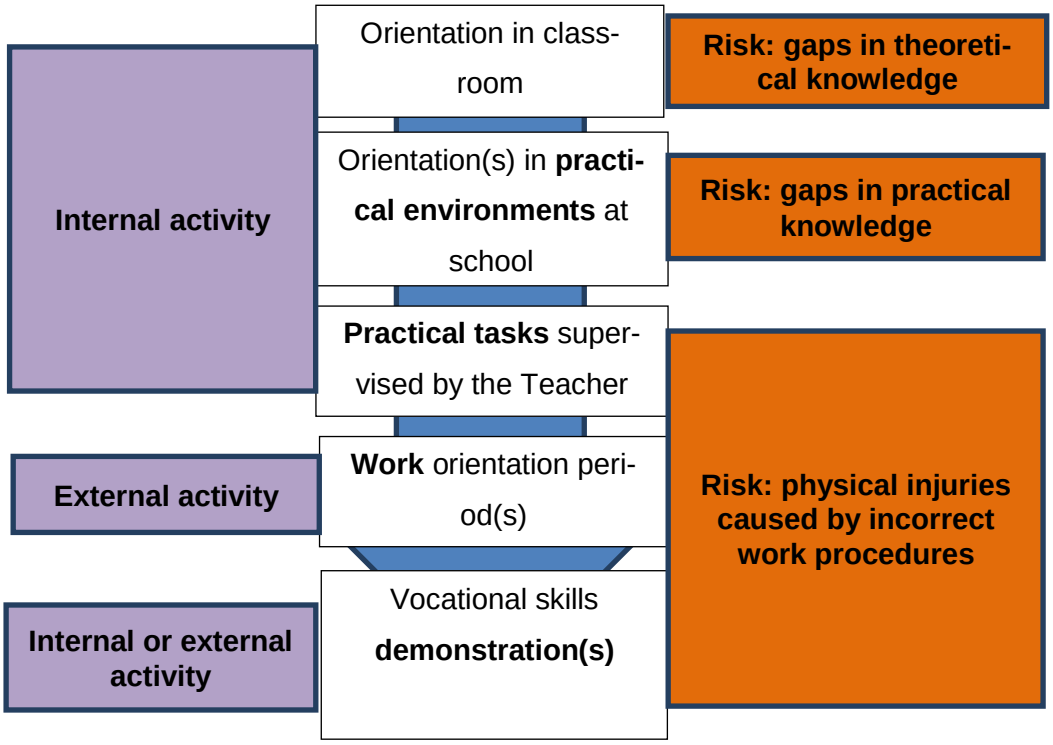

Figure 2. Educational Process in case organization.

As can be seen from Figure 2, all curricula include a number of repeated stages. First, Orientation in classroom, where theoretical knowledge is taught prior to practical orientation; second, orientation in practical environments at school which is used to familiarize students with the equipment and instruments to be used, third, practical tasks supervised by the teacher where practical tasks are practiced under teacher supervision at school, fourth, work orientation period where the student practices practical tasks at workplace and finally, vocational skills demonstration which can be accomplished ei-

ther at school premises or at a workplace. The biggest safety risks typically relate to the practical tasks supervised by the teacher as the inexperienced students perform various working procedures for the first time involving large machines and heavy equipment.

The logistics curricula also include a series of final examinations known as vocational skills demonstration which is carried out either at a workplace or at school premises in realistic working situations. Finnish National Agency for Education provides guidelines and requirements for executing vocational skills demonstrations in logistics curricula. Vocational skills demonstration is a practical work procedure planned and executed by the student under the supervision of a teacher who evaluates the demonstration in the corresponding curriculum. The purpose of a vocational skills demonstration is to examine the student's ability to perform work tasks and procedures in an autonomous fashion without outside interference. The Teacher who supervises the situation is only allowed to interfere with the vocational skills demonstration if safety is compromised. All occurrences during the vocational skills demonstration are recorded and a feedback discussion is held after the demonstration is completed and evaluation discussion is held together with the student. (Finnish National Agency for Education 2011: 38-49) If the student passes all the required vocational skills demonstrations, the student is entitled to graduate from the curriculum with a verified and sufficient amount of skills required for a particular profession.

A team of 20 logistics Teachers is used to teach both theoretical as well as practical skills required in the secondary level logistics education program. The Teachers have different competences and skill profiles based on their earlier work experience. The daily teaching activities are planned according to these individual competences and skills in order to achieve the best results in terms of professionalism and quality of the education where each Teachers' individual competences can be optimally utilized.
However, different Teachers may teach same courses involving same teaching material such as heavy equipment, tools and premises. Based on the findings of group discussion, in such occasions it is essential that all these Teachers possess at least the same skills and competences which result in homogeneous teaching, uniform safety standards and comparable learning results.

Currently, logistics education program does not have a systematic way to orientate or familiarize personnel with the various equipment used for teaching practical courses.

Findings from group discussion as well as individual interviews suggested that help was given at all times when asked concerning working procedures, equipment and other teaching material. However, this relied entirely on the activeness of the questioner without any preset or established procedure.

This approach results in differing skill profiles and skill development among the logistics Teachers. Firstly, the teachers who are active in enhancing their skills and abilities to operate the various equipment, use this ability in their daily work by teaching students in a safe and professional manner. However, the less proactive Teachers lack this professionalism which is evident in the video tape material of Data Collection 1 where first year logistics students operate heavy machinery with a Teacher who is less experienced with the machine in question hence resulting in a dangerous situation where safety of the teaching situation is compromised.

Based on the results of the group discussion, unofficial orientation and familiarization has been attempted earlier by the Teachers themselves helping one another. The case organization has an orientation program as a part of official form which is merely a short line indicating that the newly recruited teacher has received training for the equipment used at school.

3.3.2 External Activities

An eight week work training period is spent in a logistics company during both the second and the third study year. By acting in this manner, the students have the opportunity to enhance their skills in practice. The student is required to apply for work by themselves and sign their own employment contract where the employer determines which work tasks the student may practice under company supervision. If the work training is done without salary, the student is under the insurance of the case organization whereas paid work training is comparable to any regular employment contract where the employee is insured by the employer. The Finnish National Agency for Education necessitates that the employer is responsible for providing all safety equipment and work gear which is required as well as familiarization and training for the equipment used at employer's premises. (Finnish National Agency for Education 2011: 38-49) Teacher supervises the work training by visiting the work place once a week to examine and evaluate the duties accomplished by the student.

Challenges arise with non-supervised working periods where the Teacher does not have an opportunity to visit the work place in order to become assured of the safety measures, sufficient orientation or the use of proper methods and procedures. This is the case of additional work orientation periods assigned for individual students who are allowed to apply for the additional work orientation periods once all educative targets of a particular course have been reached. The roles of the Teacher and the employer are also unclear in such cases when the Teacher may not have had an opportunity to visit the employer prior to the work orientation period. Currently, on such an occasion, the responsibility of conducting an orientation to the work activities rely on the employer.

3.3.3 Work Safety Related Incidents, Safety Records and Safety Challenges

Currently, one major incident has taken place where safety was compromised. This incident was recorded on video tape as shown in Data Collection 1. Such incident is the result of a non-existent work safety policy where people are allowed to stay in the vicinity of a moving machine hence increasing the risk of being run over by the machine. Based on the findings of group discussion in Data Collection 1, similar situations could have occurred at any moment also during other practical studies such as maintenance activities where power tools, heating, hydraulics, pneumatics and electricity is used.

Currently, the orientation relies on the competences and judgement of each Teacher. Once the orientation is completed, the students begin to practice practical skills during the first year studies. The orientation is not recorded anywhere in terms of which subjects have been discussed and familiarized during the orientation. The student is not required to verify a certain level of knowledge or skills after the orientation is completed. Therefore, in problematic situations the student has the opportunity to deny the existence of any orientation or familiarization to the occurrence where the problem arises.

3.4 Analysis of the Current Safety Challenges

The safety challenges of the educational process are illustrated by red markings in Figure 3 below.

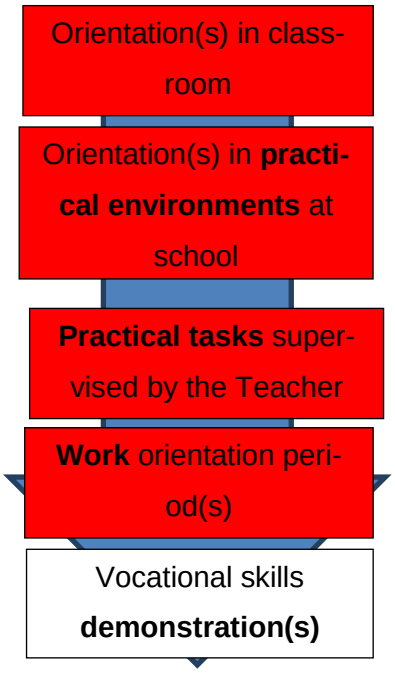

Figure 3. Challenges of educational process related to the lack of safety policy.

As can be seen from Figure 3, four safety challenges can be seen in the educational process: orientation in classroom, orientations in practical environments at school, practical tasks supervised by the teacher and work orientation periods.

As stated in Section 3.3, the orientation is not recorded in a systematic manner prior to work tasks or procedures which occur in school or during work orientation periods. The situation is problematic on such occasions when safety is compromised due to incorrect work activities executed by the student regardless of the content or competence of the orientation prior to the occasion. Therefore, from a legal perspective the orientation does not exist if the student decides to deny the contents or the existence of the orientation on such occasions when work tasks or procedures have been executed against the instructions.

As the student progresses in terms of skills and gained knowledge, the amount of practical duties is increased in order to familiarize the student with autonomous work in practical subjects. However, the progress of skills and knowledge is not taught or recorded in a systematic manner. As a result, the students have skill profiles and competences which differ from one another. Moreover, the contents of the theoretical and practical lessons are only recorded in a general manner by explaining the contents of the lesson instead of the individual competences gained by each student. This procedure is further enhanced by the data systems of the educational institution which only

require the subject of the lesson to be recorded instead of creating more accurate skill profiles of each student. This is also affected by the differing initial starting points of different students concerning their abilities to learn and absorb knowledge and implement it into practical situations.

Therefore, the team of logistics Teachers have little knowledge about the abilities of individual students when handing out tasks and work duties in the practical environments such as garage halls or earth moving sites. Currently, this knowledge relies on hearsay by fellow Teachers who have taught the student in question and can share information about the individual progress of this student. Issues also arise when the student is a customer of social services which provide help in personal conflicts concerning family life, friends, relationships, narcotics, alcohol, legal matters and other personal issues. On such occasions, the social services staff is allowed to provide only selected information of the student's current situation which may have major impact on the physical and mental ability to perform the tasks required by the Teacher.

As stated in Section 3.2, a time of two hours each week to use for development. Due to the size of the department, this time is often used for other more immediate issues & daily problems rather than systematic development of work safety. Head of department is responsible for 20 Teachers and the daily management duties as well as development of safety issues along with Administrative manager. However, Administrative manager and Headmaster are collectively responsible for safety issues, problems and accidents/casualties/injuries as the organization does not have a matrix for roles or responsibilities concerning all the key stakeholders of the case organization. In an occurrence where safety related matters lead to legal issues, both the Administrative manager and the Headmaster answer for the organization and the measures that have been taken.

Change resistance occurs on occasions when current working procedures or are going to change. This includes learning new tasks, activities and skills which correspond to the evolving requirements of the organization. Safety can be seen as one of these requirements which involve changes in current practices, attitudes, competences and skills. Currently, safety is not regarded as of primary importance in the activities executed in the organization. This approach is evident in insufficient work orientation, ununiformed working practices between different teachers and skill profiles which differ

from one another hence resulting in an inconsistent outcome in educative content and therefore in skills of the students.

Improvement of current skill profiles of the Teachers rely only on individual activeness in developing one's professional skills. Interpersonal conflicts also influence the development of skills and sharing silent information for the benefit of the department. However, a non-official habit of helping is evident on the majority of situations where less experienced teachers ask for help or assistance from senior members of the department. This type of orientation is not recorded anywhere.

3.5 Legislative Guidelines

Legislative guidelines concerning vocational education and work safety are illustrated in Figure 4.

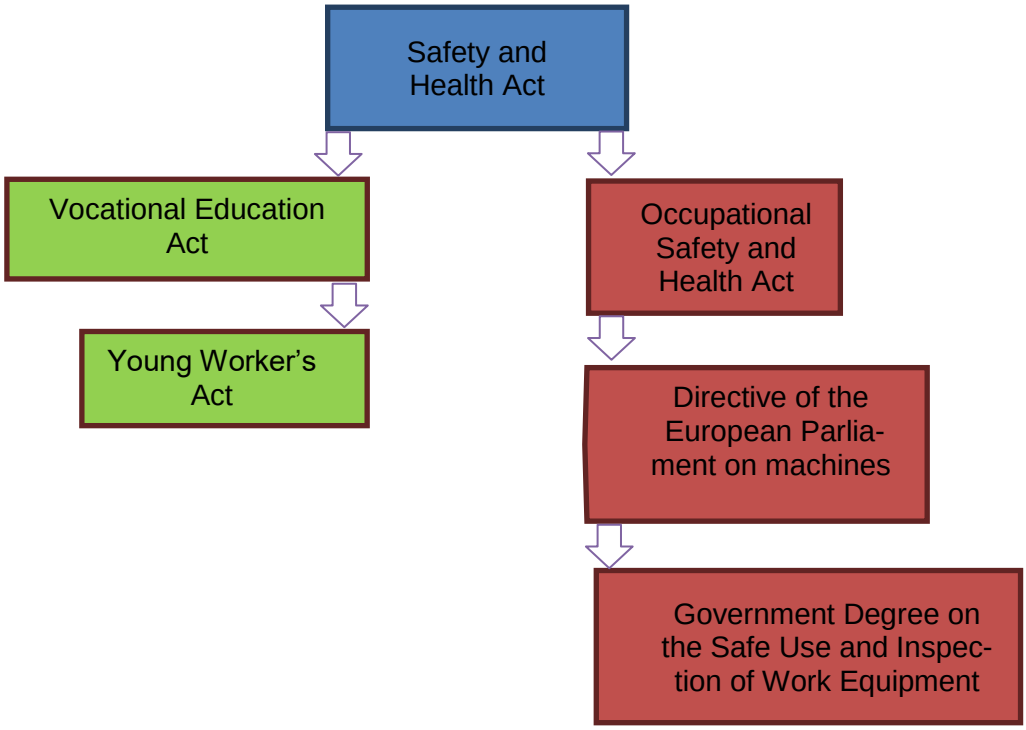

Figure 4. Legislative guidelines for vocational education.

As seen from Figure 4, vocational education is executed in a legislative environment which contains two regulatory guidelines concerning work safety in workplaces as well as safety in education. Safety and Health Act determines the general guidelines for safe working procedures and working environments on all places of employment. The-

se guidelines involve the orientation of employees, required safety equipment and accessories which must be provided for the employer for work activities, required resources to execute defined working activities and the sufficient amount measures that must be taken in order to assure the physical and mental wellbeing of the employee. Moreover, the employee is required to follow the guidelines and instructions set by the employer and notify the employer of deviations concerning these aspects.

Occupational Safety and Health Act determines the local guidelines and measures which concern the employer and employees working at the same location. Occupational Safety and Health Act includes guidelines for the orientation of the employees and evaluation concerning work procedures and conditions and to consider their effect on the physical and mental well-being of the employee at the work location. This evaluation also includes the implementation of necessary means to protect the employee by assigning an inspector who supervises the encompassing safety matters of the work activities at the location.

Working instruments such as machines and equipment are regulated by Directive of the European Parliament on machines which contains guidelines for machine compatibility and compliance on current safety regulations such as required safety features, markings and safety devices. Government Degree on the Safe Use and Inspection of Work Equipment is implemented to regulate and supervise the maintenance and condition of the working instruments and to prevent illegal activities concerning neglecting of the above mentioned safety matters and precautions.

From a pedagogical viewpoint, Vocational Education Act includes guidelines on how to plan, execute, implement and develop vocational education according to the Finnish National Agency for Educational. This includes instructions on how to plan and execute the educational situations as well as how to evaluate and assist the learning process of the student. Young Worker's Act legislates the work activities which may be assigned to underage persons as well as the regulations and responsibilities concerning work orientation and the assurance of physical and mental wellbeing and assistance of the underage person at work.

3.6 Key Findings from the Current State Analysis (Data Collection 1)

The key findings from the current state analysis, as well as challenges on the road to build the safety policy, include the following issues. Challenges of educational process and corresponding legislative guidelines are illustrated in Figure 5.

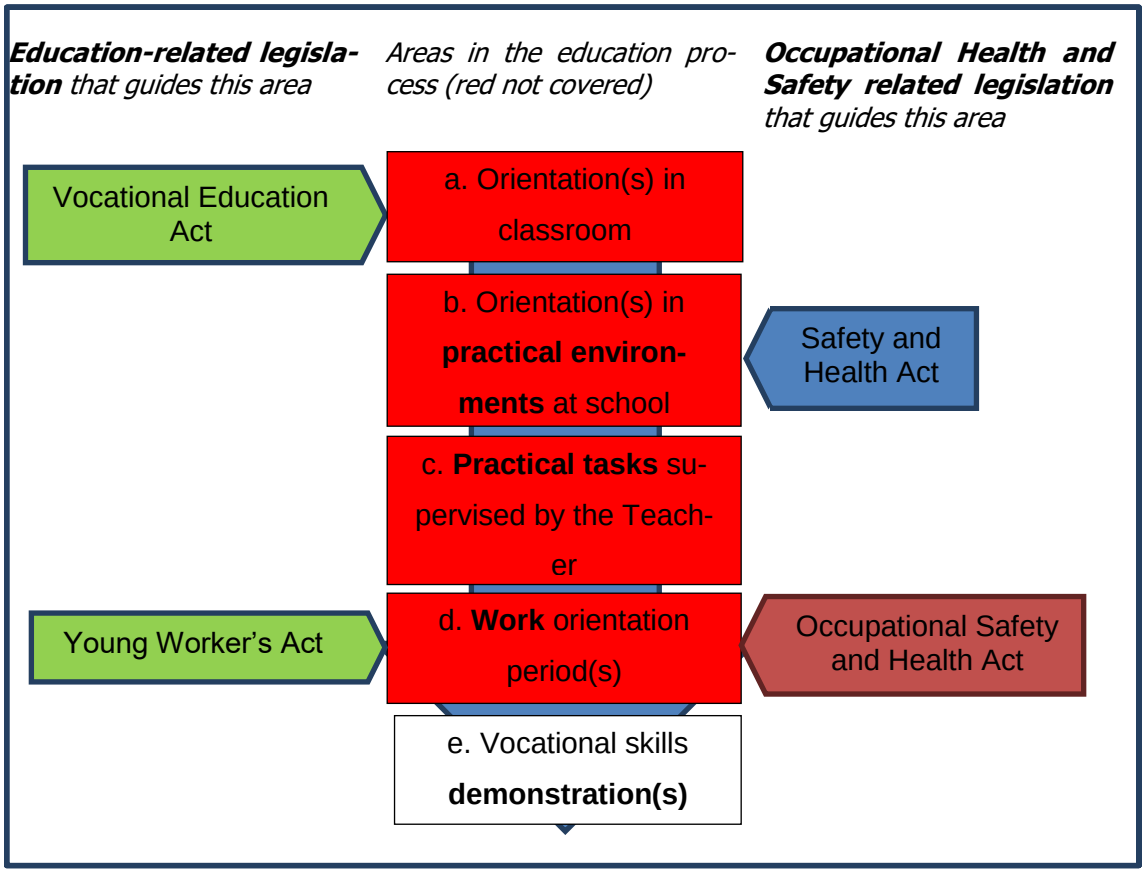

Figure 5. Areas that are currently not covered by the safety policy but show the needs for it and corresponding legislative guidelines.

As seen from Figure 5, the areas that need to be covered by the safety policy in the educational process are related to (a) *Orientation in classroom* prior to various other steps in the process, (b) *Orientation in practical environments at school,* (c) *Practical tasks supervised by the teacher* and (d) *Work orientation periods*. These areas are affected by either educational legislation or safety legislation. As stated in Section 3.2, the organizational structure does not currently define the roles or responsibilities of all the key stakeholders. Currently, in the case of an incident, the headmaster and the Administrative manager of the corresponding operating unit are responsible for the procedures and measures that have been taken to prevent the incident. The roles or responsibilities of the Head of department, the Teacher and the student are not defined or recorded.

Based on the findings of Section 3.3, the case organization does not have an orientation program. This issue involves both the Teachers as well as the students: in terms of competence profile of the Teacher, who has received orientation and familiarization for the equipment and work instruments used in the case organization, and the competence profile of the student who is taught by the Teacher. Therefore, the lack of orientation program affects the quality of the education by creating inconsistent teaching procedures and an inconsistent level of safety orientation for the students both in internal and external sites.

Firstly, these challenges are reflected on the orientation executed in classroom where Teacher provides the theoretical background concerning the future work tasks practiced by the students. Secondly, the challenges occur during the orientation on practical environments at school where students are familiarized with the features of the equipment and instruments that are the subject of practicing. Thirdly, the challenges involve the work orientation period on such occasions where the Teacher does not have the possibility to visit the partner organization beforehand. Finally, this results in an inconsistent and unrecorded series of procedures which do not assure the measures or procedures that have been taken to provide verifiable information for all key stakeholders of what is being done and by whom

Currently, the contents of the orientation depend on the actions of individual Teachers who independently wish to gain more information to support their work activities. The contents of this voluntary orientation is not recorded in a systematic way to create an understanding about the skill profile of each teacher. Moreover, the orientation provided for the individual students lacks documentation. Therefore, the Teachers are not able to access information about the current skills and competences of their students, which is critical information when planning work exercises for these students as well as providing assistance and supervision for the successful execution of such exercises.

4 Conceptual Framework Concerning Health and Safety

This section discusses existing knowledge and best practice approaches concerning health and safety in organizations.

4.1 Concept of Safety Culture

The concept of Safety Culture has been used widely in different areas of work and accident reports. Afterwards, a bad Safety Culture has been recognized as an essential contributor to accidents. However, a commonly recognized definition of a Safety Culture has not been established and the concept of Safety Culture has been criticised for being theoretically inaccurate. However, the concept of Safety Culture has been established in general discussion, law enforcement, research and development in such extent that the theoretical examination of the concept of Safety Culture is in order. (Reiman et al. 2008: 7-8)

In essence, the concept of Safety Culture comprises the organizational ability and will to comprehend what is understood by the safe operation of the organization , what type of risks are related to these operations and how these risks can be prevented. Moreover, the concept Safety Culture also includes the ability and will to operate in a safe manner, to prevent the risks and therefore enhance safety. Therefore, the Safety Culture is a dynamic state which evolves hence making it a complex issue. However, the Safety Culture can be influenced by combining the organizational experiences, views, social phenomena of the organization and its operational processes. (Vecchio-Sadus 2007: 1-2)

Safety critical organizations are such organizations which operate in critical environments concerning safety matters that can cause serious damage or harm the wellbeing of the general public or the environment. (Reiman et al. 2008: 7). Examples of such organizations are airlines, shipping operators, industrial companies operating in chemical manufacturing, nuclear power plants and healthcare organizations where the significance of evaluation and development of safety matters is emphasized. The embedding of Safety Culture requires the establishment of Safety Management.

4.2 Safety Culture and Safety Management

The concept of *Safety Culture* is changing from Human Factors perspective towards Human and Organizational Factors perspective where the Safety Management emphasizes on the actions of an individual person as well as organizational structures and social factors. Safety Management is regarded as critical in terms of enhancing organizational commitment towards a functional Safety Culture. (Reiman et al. 2008: 7)

The Safety Culture comprises of organizational elements such as structures, requirements and limitations, social and psychological factors as well as the implementation of these elements. The Safety Culture illustrates the organizational ability to comprehend the nature of safety in its operations, recognize safety hazards and to prevent them and thereby develop safety within the organization. (Demichela et al. 2004: 179-180) Safety Culture is a dynamic state which can be influenced on multiple levels such as experiences, views and sentiments, social phenomena and operational activities. (Muniz et al. 2009: 980) A functional Safety Culture includes sufficient means to conduct work in a safe manner where safety matters have been recognized and considered. This also includes the development of safety and possibilities to influence on this development. The Safety Culture includes the entire organization on all organizational levels where all participators communicate with each other and therefore affect safety. It can only be developed as a result of an effective Safety Management.

Safety Management can be regarded as a comprehensive management of safety related issues. The target of Safety Management is to develop work and working environment from safety perspective fulfilling both legislative and organizational guidelines and requirements. Safety Management is a combination of methods, procedures and managerial entities. (Muniz et al. 2007: 54) Safety Management is used to enable the organization to implement and develop a safety policy which fulfills the legislative requirements concerning Occupational Health and Safety, OH&S.

In addition to organizational dimensions, the Safety Culture includes a psychological dimension which includes subjective experiences and views of work related safety and risks. The management of work, appreciation of safety, responsibility and awareness of safety matters are psychological phenomena as they are subjective sentiments and comprehensions. However, the psychological dimensions can be regarded as cultural

dimensions of the organization as they are born upon the collaboration of individual members and the social environment of the organization (Reiman et al. 2008: 89)

In addition to organizational and psychological dimensions the Safety Culture can be seen as a phenomena with social processes. All these three dimensions are considered when the Safety Culture of an organization is evaluated as the organizational dimensions influence the psychological dimensions and the social processes. Moreover, the psychological dimensions such as individual abilities and motivations to perform work tasks in a safe manner also influence the organizational dimensions and social processes. From a motivational perspective it is essential that the various members of the organization have an understanding of the significance of a functioning work safety culture. (Reiman et al. 2008: 90)

Safety Management translates into organization efforts to make the work environment safe. However, in addition to organization efforts and organization dimension, there should also be cultural, even personal, efforts by the members to implement work safety in everyday life. If detailed, the organizational and personal dimensions can be illustrated using the OH&S approach in Table 6 below.

Table 6. Organizational and personal dimensions of the OH&S approach (Based on: Reiman et al. 2008: 89).

Safety Management	Organizational dimensions • Organizational commitment towards health and safety culture • Structures, requirements, limitations concerning OH&S • Organizational ability to comprehend the concept of safety • Recognizing, consideration and development of OH&S
Safety Culture	Psychological dimensions • Management of work • Appreciation of health and safety • Responsibility and awareness of health and safety matters • Collaboration between individual members of the organizational • Abilities and motivation to implement OH&S

As can be seen from Table 6, In addition to organizational dimensions, *Safety Culture* includes a psychological dimension which includes subjective experiences and views of work related safety and risks. The management of work, appreciation of safety, responsibility and awareness of safety matters are psychological phenomena as they are subjective sentiments and comprehensions. (Costella et al. 2009: 1058-1060) However, the psychological dimensions can be regarded as cultural dimensions of the organization as they are born upon the collaboration of individual members and the social environment of the organization (Reiman et al. 2008: 89; Makin A.L. and Winder C. 2008: 937)

A functional Safety Culture creates the prerequisites for safe working environment and enables the necessary procedures as a part of organizational processes including their social phenomena and psychological dimensions. Therefore, a systematic approach is needed to implement these procedures and processes.

4.3 OHSAS Management Approach

One of possible approaches to implement Safety Management is the OH&S approach. If the organization chooses to use existing approaches to create procedures for Safety Management, one of such approached is offered, for example, by Occupational Safety and Health management systems OHSAS 18001 and OHSAS 18002. This is a standard for evaluating and certifying the management systems of various organizations against the recognizable safety management system standards. The target of these standards is to provide a systematic approach to management of Occupational Health and Safety, OH&S. (Occupational Safety and Health Administration in Finland 2010: 11)

Safety Management procedures created by the standards OHSAS 18001 and OHSAS 18002 are regarded as (OHSAS 18002: 2008: 1-4). Occupational Safety and Health Act does not necessitate a safety management system (Occupational Safety and Health Act 738/2002). However, standardized safety management systems are an efficient way to assure the legislative guidelines Occupational Health and Safety as well as self-imposed requirements of the organization. The advantage of a standardized Occupational Safety and Health system is the possibility of certification. By certifying the Occupational Safety and Health system, OH&S, the organization is able to evaluate the fulfillment of the requirements and also indicates the use of an adequate level of

procedures concerning safety and health. (Vinodkumar and Bhasi 2011: 498-507) The certification challenges organizations to improve their occupational safety and health procedures by updating the performance and the OH&S targets in order to receive the certificate. (Granerud and Rocha 2011: 1030-1039)

The implementation of a safety management system involves various operations of the organization including safety policy, roles and responsibilities, employee incentives for participating, education and training, communication concerning organizational safety and health procedures as well as monitoring the development of the above process. (OHSAS 18002 2008: 5-9) OHSAS 18001 standard has been established to support and facilitate the evaluation of Safety Management and certification process. The purpose of the standard is to introduce the building blocks of an efficient OH&S approach where the organization is able to plan and execute relevant actions and procedures towards the individual targets of the organization and moreover, develop the process continuously. The OHSAS 18001 system does not necessitate direct guidelines for the OH&S approach but provides requirements and guidelines about the contents of the safety policy. The requirements and guidelines for safety policy are represented in Table 7.

Table 7. Requirements and guidelines for safety policy.

	Requirement	Description
1	Scope	Establish a sufficient level of procedures concerning the risk evaluation of the case organization
2	Commitment	Commitment to prevent and remove safety and health related risks
3	Improvement	Continuous improvement of OH&S
4	Requirements	Conformation to legislative requirements and in-house guidelines
5	Resources	Provide resources for OH&S planning, development and evaluation

As can be seen from Table 7, the requirements and guidelines from OHSAS 18001 suggest the establishment of safety policy from the viewpoint and motives of the organization in such way that the current procedures can be evaluated, improved and developed while conforming to legislative requirements and in-house guidelines. By acting in

this manner, the OH&S approach can be accommodated to the values, organizational needs and previous level of procedures. The OHSAS 18001 safety management system is also compatible with ISO 9001 and ISO 14001 management systems. (OHSAS 18002 2008: 68-70)

The organization provides procedures for risk evaluation and determines the procedures for a continuous process. Special attention is given towards the changes of the organization and the risks which are involved in these changes. The advantage of preventative focus on the risk evaluation is to recognize the risk and evaluate its significance to determine the correct procedures and schedule for the corrective measures which are then documented. (OHSAS 18002 2008: 5) The risk evaluation methods are not preset and therefore they can be suited to the organizational needs in terms of size of the organization, scope, detail and available resources.

However, the OH&S approach is required to recognize the current legislative requirements and to conform to these requirements. The key stakeholders are informed about these requirements and special attention is given to such procedures which improve the accessibility of the current requirements which influence the key stakeholders. (OHSAS 18002 2008: 13) The current state analysis of the organization is used to recognize the requirements concerning industry, organizational activities, processes, premises, equipment, materials, key stakeholders and location. The OH&S approach in OHSAS management standard is illustrated in Figure 6.

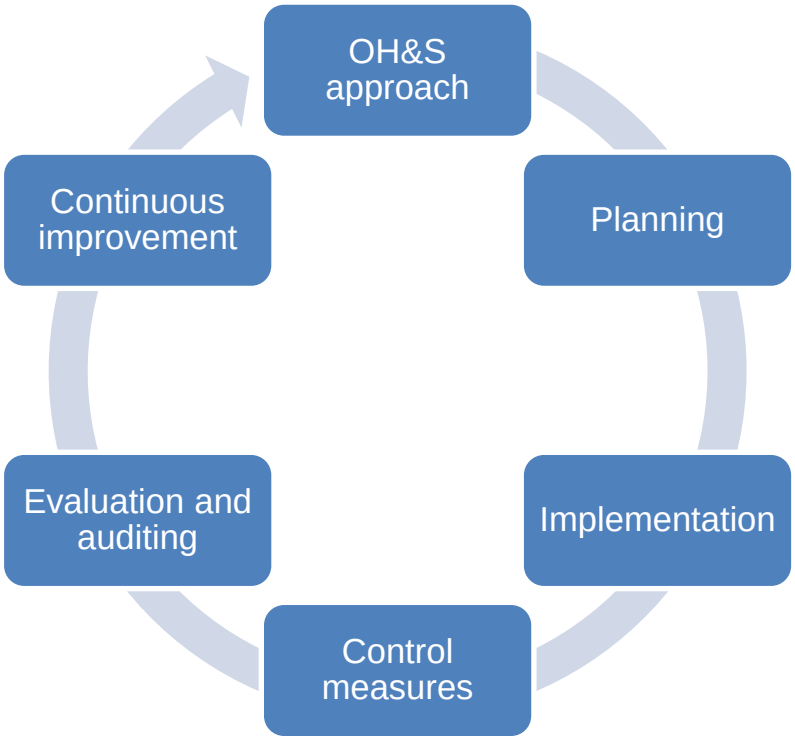

Figure 6. OH&S approach in OHSAS 18001 management standard.

As can be seen from Figure 6, the organization is required to set targets during the planning of Occupational Health and Safety approach. By revising the targets the organization is therefore able to improve the level of OH&S procedures. The targets are set in such a way that all the requirements of the OHSAS 18001 system are met along with legislative guidelines concerning the prevention of such entities which compromise health and safety. (OHSAS 18001 2007: 12-13).

In addition to setting the targets, the organization is required to create a program for the utilization of OH&S. Therefore, by using this program, the organization is able to reach the set targets. The program contains all such means which assist in reaching the targets, the responsibilities of required procedures, authorities to administer and execute the required procedures and schedules for the required procedures. The communication about the schedules and the program targets is assured to the proprietary members of the organization. Finally, the program is revised and updated when needed. (OHSAS 18001 2007: 12-13).

4.3.1 Planning

The planning process of OH&S begins with establishing and implementing the procedures for risk identification, risk evaluation and selecting the correct procedures. First, hazard identification and risk evaluation includes all key stakeholders who access the workplace such as internal personnel, visitors and contractors, second, all the premises and their surroundings where work is executed including all such hazards which occur at these premises or at the surrounding areas, third, all such activities which can be controlled by the organization and fourth, all the work related equipment, instruments and materials. Finally, the organization, the management system, the organizational processes including temporary or permanent changes in these entities are identified and evaluated in terms of risks. This also includes the modifications to OH&S system which may influence the risk identification and evaluation process and the procedures.

The OHSAS 18001 system suggests the focus of the risk identification process towards a proactive approach instead of reacting to an existing risk. This also influences the prioritization and scope of procedures and methodology to control the risk including change management where the risks involving the change management are identified and evaluated in a proactive manner. The risk is controlled by a hierarchy of procedures as follows: first, elimination of the risk, second, substitution of the risk with a safer means, third, engineering towards a safer working environment, fourth, warning devices and finally protective personal equipment. (OHSAS 18002 2008: 15) All risk identification and evaluation procedures as well as the controlling measures are documented for further investigation and to provide background for revisions. The organization is also required to ensure that the controlling measures have been established, implemented and maintained according to the OH&S approach. As illustrated in Figure 7, the risk identification, evaluation and controlling process is a continuous series of procedures.

4.3.2 Roles and Responsibilities

An operational approach necessitates the commitment of management of the organization in establishing, implementing and developing the OH&S approach. (Robson et al. 2007: 332) The management designates its commitment by providing sufficient resources for the establishment and maintenance of the OH&S and defining the roles

and responsibilities of the OH&S approach and its procedures. (OHSAS 18001 2007: 25).

The roles and responsibilities are determined on the basis of organizational levels where each level has defined responsibilities including the responsibility boundaries of other organizational levels. The organization also designates a member from the high managerial level who is responsible for health and safety matters. The identity of this member is required to be known by all members of the organization. The representative of the OH&S approach is required to be a member of the high managerial level with a superior position towards other personnel which have responsibilities in designated responsibility areas of OH&S approach. (OHSAS 18001 2007: 27)

All personnel which deal with the health and safety of the organization, such as the OH&S risk identification and evaluation and the implementation of the OH&S approach, must be possess proper training and competences with documentation. Therefore, the organization must recognize the needs for further training concerning health and safety and to assure that these qualifications are maintained and documented regularly. (OHSAS 18001 2007: 27)

All members of the organization must be aware of the risks and roles and responsibilities concerning the OH&S approach. By using this information, each member is required to evaluate the effect of individual actions to OH&S matters and to comprehend the individual roles and responsibilities in reaching the required level of procedures. (OHSAS 18001 2007: 25) Therefore, the organization is required to possess such procedures which participates the members of the organization in the OH&S activities such as risk identification and evaluation and controlling measures as a member of the organizational OH&S approach and its targets.

4.3.3 Documentation

The OHSAS 18001 system necessitates the documentation of the procedures including OH&S policy and its targets as well as the structure, the scope and the relations of the different sections of the OH&S approach. This also includes references to the correct documents and recordings which the organization regard as relevant to assure the effectiveness of the OH&S approach. The documentation is required to be in such form which allows a sufficient understanding of the OH&S approach and hence the efficient

implementation of the necessary procedures. Special attention is therefore given to such occurrences where the lack of sufficient documentation and instructions may cause a risk. (OHSAS 18001 2007: 29)

4.3.4 Evaluation

The organization is necessitated to establish a procedure which allows to measure the performance of OH&S approach. The target of the measuring is to supervise the fulfilment of the targets and to provide information about the efficiency of the controlling measures. This also facilitates the supervision of the development of health and safety matters, how the processes work and how the instructions and documentation are obeyed. This approach also requires the collection of data to gain results. (OHSAS 18001 2007: 33) The collection of the data is planned in terms of when and where the data is collected and which collection method is used. The results are analyzed to recognize successful and improvement areas with the emphasis on proactive measures. (OHSAS 18001 2007: 34)

4.3.5 Auditing

The organization utilizes internal audits for the OH&S approach where the system is evaluated in terms of adequateness and relevance towards the intended usage and the requirements of the OHSAS 18001 system in the selected scope which has been decided to use for the organization. The audit is also used to supervise the implementation and maintenance of the OHSAS 18001 system in reaching the targets of the OH&S approach. The management is then informed about the received information. The current audit also takes into account the previous audits and their results. The executors of the audit are chosen in such a way that the objectiveness and neutrality is assured. The audit procedures are required to cover all activities and procedures of the organization which operate under the authorization of the OH&S approach. (OHSAS 18001 2007: 35)

The frequency of the audits is synchronized with the requirements of the organization concerning the risks. This also includes the necessity to implement supplementary audits if such occasions occur. These occasions are the increase of risks, situations

where safety and health is compromised and when the organization or circumstances change. (OHSAS 18001 2007: 35)

The management is required to review the OH&S approach regularly to assure that the system is relevant and adequate for the organization. The review includes the OH&S approach and the development of the OH&S targets. The inputs of review included in the inspection are presented in Table 8 below.

Table 8. Management review inputs.

	Review input
1	Results of internal audits
2	Results of collaboration
3	Contacts from outside stakeholders
4	The level of OH&S procedures
5	The level of reaching the targets
6	The state of hazard inspection and corrective measures
7	Following procedures from previous inspections
8	Improvement suggestions

As seen from Table 8, the review includes all such inputs which determine the level of OH&S procedures and commitment to establish and implement these procedures according to the OH&S process. Moreover, the inputs also emphasize the pro-activity of procedures to develop the process based on the learnings of the organization during the OH&S process. (OHSAS 18001 2008: 65-67)

4.3.6 Compliance

The level of compliance concerning the OH&S process can be evaluated by determining the current level of activities compared to the requirements of the OH&S approach. An example of compliance to the requirements is presented in Table 9 below.

Table 9. Compliance to the OH&S requirements in case organization.

	OH&S requirements in case organization	Level of compliance (percentage)	Rate of non-compliance (percentage)
1	Risk identification, evaluation and control measures	20	80
2	Planning	50	50
3	Roles and responsibilities	0	100
4	Training and competences	100	0
5	Communication and collaboration	0	100
6	Documentation	0	100
7	Evaluation	0	100
8	Auditing	0	100
9	Management review	10	90

As seen from Table 9, the level of compliance in the case organization for each procedure is determined by a percentage which illustrates the measures that have been taken to comply with the requirements of the OH&S approach. The percentage is defined by using the list of procedures and actions presented in the OHSAS implementation guide for each OH&S requirement (OHSAS 18002 2008: 26-67). By acting in this manner, an understanding of the compliance is created by comparing the measures that have been taken to the requirements which are defined in the OHSAS management system.

A process of methods is required to put the OH&S requirements into practice by continuously improving the performance of the OH&S approach. An example of such process is represented in the following section.

4.4 PDCA - Plan Do Check Act

Plan Do Check Act, PDCA, is a process of methods. The operations of an organization can be managed with the application of a process which has different methods that interact with each other. Plan Do Check Act process is a principle which is common for a management system. The Plan Do Check Act process is presented in Table 10.

Table 10. Plan Do Check Act process.

	Method	Description
1	Plan	Objective is set and processes are established to meet the objective
2	Do	Processes are implemented
3	Check	Process performance is examined and evaluated
4	Act	Corrective measures to improve performance of the processes

As seen from Table 10, first, a target is set towards a certain goal. Second, processes are created to reach the target. Third, actions are taken to execute the processes. Finally, the actions are examined to evaluate the results and their relation to the set target. This approach also includes improving the performance upon the results of the processes to improve the process performance. PDCA process can be applied to all processes. (OHSAS 18002 2008: 2) In conclusion, first, the PDCA process instructs organizations to plan their actions, second, to implement them and third, to check the outcome of these actions (Johnson 2016: 45). Finally, the organization is able to evaluate, what has been learned from the PDCA process.

4.5 Conceptual Framework of This Thesis

This section has discussed the existing knowledge on and best practice approaches concerning safety policies and Safety Management in organizations which originate from the findings of the current state analysis. The purpose of this chapter is to summarize the findings from existing knowledge and best practices to combine these elements into a conceptual framework. The main elements from the conceptual framework for this thesis are the concept of utilizing a Safety Culture by establishing the components of Safety Management which are illustrated in Figure 7 below.

Figure 7. Conceptual framework of this thesis.

As seen from Figure 7, the components of Safety Management include the OHSAS safety management standard which is utilized to provide a systematic standard approach to the management of Occupational Health and Safety management approach, the OH&S. The OH&S system guides the organization to fulfil the health and safety

requirements possessed by the legislation and organizational requisites by utilizing a series of procedures which assists in planning, implementing, controlling, evaluating and improving the health and safety procedures up to the OHSAS safety management standard.

This section defined the conceptual framework of this thesis including Safety Management, OHSAS safety management standard and OH&S safety management approach. The next section utilizes the insights from conceptual framework to build a proposal for the establishment of a pre-plan for the development of a work safety policy for the case company.

5 Proposal Draft for a Pre-plan for the Development of a Work Safety Policy

This section merges the results of the current state analysis and the conceptual framework towards the building of the proposal. The section addresses the steps of building the proposal, proposal development and inputs from key stakeholders on Data Collection 2, and finally, the proposal draft for pre-plan for the development of work safety policy.

5.1 Overview of Proposal Building Stage and Data Collection 2

The Proposal building is following this logic presented below. First, the current state analysis revealed the areas where currently safety policy is missing but needs to be applied in the case organization. These areas were selected as the development priorities. In addition, for building the safety policy, a certain approach needs to be adopted. In the context of this study, the approach was identified as having: (a) the absence of a Safety Culture, (b) the lack of a systematic Safety Management approach and undefined roles and responsibilities of key stakeholders, and (c) building the safety policy *per se*.

Second, existing knowledge from literature concerning the development priorities were discussed in section 4: the concept of Safety Culture, Safety Management and systematic approaches to address these subjects.

Third, the proposal draft is based on the summary of current state analysis and conceptual framework. The proposal was built based on Data Collection 2 which included key stakeholder input from the members of the organization and official work safety authority. The summary of CSA weaknesses and development possibilities from CF were discussed in co-operation with the key stakeholders.

Finally, the elements of the proposal draft are combined and illustrated in a table which presents the guidelines, recommendations and actions to establish, implement and audit the development of work safety policy in the case organization. The pre-plan also includes roles and responsibilities of key stakeholders, order of implementation, schedule of implementation and audition of implementation to fulfil the legislative and organizational requirements concerning the development of work safety policy in the case organization context.

The proposal was built based on the findings of current state analysis, CSA, development ideas from the literature of conceptual framework, CF, and Data Collection 2. CSA findings were used to determine the focus areas for CF. Data Collection 2 was used to gather feedback for both the issues found in CSA and the development ideas of CF in order to create a proposal suited to the case organization.
Development needs and ideas according to the findings from CSA, CF and Data Collection 2 are as follows: firstly, the establishment of a Safety Culture, secondly, a management approach by utilizing the OH&S safety management approach and thirdly, a pre-plan for the development of work safety policy where roles and responsibilities of the key stakeholders of the organization are determined.

The outcome of the proposal is a pre-plan for the development of work safety policy on a managerial level of the organization. The proposal was achieved by using the development ideas from CF to determine the focus areas for the creation of a pre-plan for the development of work safety policy. The development of the proposal is presented in Table 11 below.

Table 11. Proposal development.

	Key challenges from Current State Analysis	**Best practices from Conceptual Framework**	**Data Collection 2 input**
1	The absence of a Safety Culture	The development of Safety Culture by using guidelines from the OH&S system	The case organization is required to have a systematic approach for the following: • Documentation of risk identification, evaluation and corrective procedures • Documented roles and responsibilities of key stakeholders • Documentation of competences of key stakeholders • Documentation of planning, compliance, audit reports and schedule for iteration process
2	The lack of systematic Safety Management approach	The establishment of Safety Management by using the OHSAS safety management standard and PDCA process	
3	Undefined roles and responsibilities of key stakeholders		

As can be seen from Table 11, key challenges from current state analysis are addressed by utilizing best practices from conceptual framework and key stakeholder input from Data Collection 2.

The Data Collection 2 involved key stakeholders of the case organization including the Administrative manager, the Head of logistics department and a work safety authority in an open group discussion on two separate occasions where the matters of Table 7 were addressed to find the best practice approach for the case organization.

> "The OHSAS management standard can be implemented as such into your organization where the benefit of such system results in a systematic way to manage safety and, moreover, commit all organizational levels into the Safety Policy. Without it you will be in trouble if something happens and these things are not planned, defined or recorded anywhere. The main thing is that you have some documentation of what has been done, by whom and when. Once when you get the system running, you can start to develop it."
>
> Work safety authority

> "The practical implementation of the Safety Culture and Safety Management will involve the Head of department as the executor of the activities as I have very little time to supervise the daily operations. I provide the resources according to the roles and responsibilities matrix and the Head of department puts it into practice on a local level by evaluating the risks and finding out the right procedures to tackle them in a sufficient manner. That's the only way we can manage our operations up to the requirements."
>
> Administrative organizational manager

Firstly, Safety Culture is put into practice of the operations of the case organization by, first, defining the scope of procedures concerning risk evaluation in the case organization, second, commitment to remove the risks, third, by continuous improvement of OH&S, fourth, by conforming to legislative requirements and internal guidelines and finally by providing the resources to plan, develop and evaluate the OH&S approach.

Secondly, Safety Management is implemented into the daily operations by the commitment of the managerial level of the organization by defining the sufficient level of organizational procedures according to the existing knowledge of contextual framework and Data Collection 2.

Finally, roles and responsibilities are specified by establishing a pre-plan which includes the guidelines for the development of a work safety policy with defined procedures derived from the OH&S approach and OHSAS safety management standard.

5.2 Proposal Draft

The object of this chapter is to portray the proposal draft for the pre-plan for the development of work safety policy in the context of the case organization. The proposal draft is presented in Table 12 below.

Table 12. Proposal draft of the pre plan for the development of work safety policy.

<table>
<tr><th colspan="2">Safety Culture</th></tr>
<tr><td rowspan="4">Key concepts of safety culture which influence the development and implementation of pre-plan in case organization are as follows:
Management of work
Appreciation of health and safety
Responsibility and awareness of health and safety matters
Collaboration between individual members of the organizational
Abilities and motivation to implement the OH&S system</td><td>Responsibility of implementation:
Safety Culture is established on an administrative level</td></tr>
<tr><td>Order of implementation:
Safety Culture evolves as a result of successful safety management</td></tr>
<tr><td>Schedule of implementation:
Immediate implementation</td></tr>
<tr><td>Audition of implementation:
Audition is executed according to the requirements of OHSAS management system</td></tr>
<tr><th colspan="2">Safety Management</th></tr>
<tr><td rowspan="4">The OH&S approach is utilized as a systematic approach to develop and implement Safety Management:
Identification of risks
Defining roles and responsibilities
Documentation of the procedures of OH&S policy
Evaluation of the performance of OH&S approach
Supervision of the implementation of OH&S approach
Compare the performance and implementation to the requirements of OH&S
Iteration by using the Plan-Do-Check-Act, PDCA</td><td>Responsibility of implementation:
Safety Management is implemented by managerial level and put into practice by employees</td></tr>
<tr><td>Order of implementation:
Safety Management develops as the concept of Safety Culture evolves</td></tr>
<tr><td>Schedule of implementation:
Immediate implementation</td></tr>
<tr><td>Audition of implementation:
Audition is executed according to the requirements of OHSAS management system</td></tr>
</table>

Summary of a pre-plan		
1	Planning	Establishing and implementing the procedures for risk identification, risk evaluation and selecting the correct procedures
2	Roles and responsibilities	Defining the roles and responsibilities of the key stakeholders of the case organization concerning the OH&S approach and its procedures
3	Documentation	Documentation of the procedures including OH&S policy and its targets as well as the structure, the scope and the relations of the different sections of the OH&S approach
4	Evaluation	Establishment of a procedure which allows to measure the performance of OH&S approach
5	Auditing	Supervision of the implementation and maintenance of the OHSAS 18001 system in reaching the targets of the OH&S approach
6	Compliance	OH&S process is evaluated by determining the current level of activities compared to the requirements of the OH&S approach
7	Iteration: Plan-Do-Check-Act	First, objective is set and processes are established to meet the objective, second, processes are implemented, third, process performance is examined and evaluated and finally corrective measures to improve performance of the processes

As can be seen from Table 12, the concepts of Safety Culture and Safety Management commit and engage both the administrative and the managerial level of the organization towards the procedures of the OH&S approach. The procedures of the OH&S approach function as the pre-plan which operates as a list of procedures to be established and executed.

The pre-plan consists of the procedures presented in OH&S approach and consequently in OHSAS safety management standard. These procedures are *planning*, *roles and responsibilities*, *documentation*, *evaluation*, *auditing* and *compliance*. By utilizing the procedures from OH&S approach, the pre-plan results in the development of Safety Culture and Safety Management.

The OH&S approach is regarded as a structured approach towards the pre-plan for the development of work safety policy, where the content of each procedure is pointed out. Plan-Do-Check-Act is used as an iteration to continuously develop the pre-plan.

The pre-plan consists of OH&S approach with elements from OHSAS safety management standard, including the Plan-Do-Check-Act. Therefore, the pre-plan is developed

to plan the OH&S approach, to determine and document the roles and responsibilities of the case organization and its key stakeholders and to evaluate the performance and compliance of the pre-plan to the requirements of the OH&S approach.

This section addressed the proposal draft concerning pre-plan for the development of work safety policy for the case organization. The proposal draft was formulated and explained as a list of organizational procedures including roles and responsibilities of the key stakeholders. The following section addresses the validation of the proposal draft towards the final proposal.

6 Validation of the Pre-plan for the Development of Work Safety Policy

This section discusses the validation of the proposal by gathering feedback from the key stakeholders of the organization and the work safety authority. Additionally, the final proposal is discussed and an action plan is established for immediate activities.

6.1 Overview of the Validation Stage and Findings of Data Collection 3

The proposal draft was co-developed with key stakeholders from case organization and work safety authority. The proposal draft was based on CSA and CF and Data Collection 2. The proposal draft was validated by utilizing an open group discussion involving the work safety authority, Head of department and Organizational administrative manager.

The aim of the group discussion was to gather feedback, development ideas and to formulate a view of the functionality of the pre-plan in the case organization context involving the key stakeholders who have participated in the initial proposal draft and who are responsible of the implementation of the proposal draft in the case organization. The feedback and development ideas are presented in Table 13 below.

Table 13. Feedback and development ideas for the proposal draft.

	Informant	Feedback and development ideas
1	Work safety authority	The pre-plan can be implemented in the case organization and is advanced considering the educational sector context in general. Special attention should be given to the roles and responsibilities of each key stakeholder and the documentation of the responsibilities. Another significant factor is the regularity of planning where the risks are identified and corrective measures are chosen. The immediate priority in your organization is to have a basic system with basic requirements which can be developed over time.
2	Organizational admin-	A significant amount of resources has been utilized for

	istrative manager	the development of the pre-plan and it has benefited the organization in improved procedures for risk identification, for providing documentation of the measures that have been taken as well as for identifying the roles and responsibilities for each key stakeholder. The challenge here is the active maintenance of the commitment towards the occupational health and safety.
3	Head of department	The challenge for the implementation of the proposal will be the change resistance and management of change within the department. The work has to be done step by step so that the whole process proceeds systematically and the employees see the benefits of the change.

As can be seen from Table 13, the proposal was approved by the key stakeholders of the organization and the work safety authority. The pre-plan was considered as competent and applicable in the case organization context. Discussion aroused concerning risk identification, roles and responsibilities, documentation and auditing all of which effect the implementation, continuous improvement and organizational commitment towards the occupational health and safety matters.

Development ideas were not introduced as the proposal was considered adequate for the current situation of the case organization where the emphasis is on the implementation of the proposal and its elements. However, the development potential will be considered as a part of the approach when the proposal is put into practice and reconsidered according to the cycle of continuous improvement.

6.2 Final Proposal

The objective of this thesis was to *establish a pre-plan for the development of a work safety policy* for vocational education program in logistics. The proposal includes the concept of Safety Culture, an approach towards Safety Management and a pre-plan for the development of work safety policy according to the OH&S approach.

The current state analysis of this thesis indicated that the roles and responsibilities of key stakeholders were undefined in the case organization. Therefore, the case organization does not have a systematic approach towards OH&S. Based on existing knowledge in conceptual framework, Safety Culture, Safety Management and systematic approaches to implement these entities are essential in the development of OH&S.

The pre-plan for the development of work safety policy provides means for the case organization to improve the OH&S by establishing the OHSAS management approach to improve Safety Culture and Safety Management in the case organization.

The proposal draft was accepted by the key stakeholders of the organization and the work safety authority all of which agreed that the proposal fulfills the legislative requirements concerning Occupational Health and Safety as well as the organizational demands. Therefore, the final proposal is the initial proposal which includes Safety Culture, Safety Management and a summary of a pre-plan. The proposal is presented in chapter 5.3.

The following and final section discusses the thesis and draws conclusions.

7 Discussion and Conclusions

This section summarizes and evaluates the thesis and discusses managerial implications. Additionally, the thesis is evaluated in terms of outcome, objective, reliability and validity.

7.1 Summary

The objective of this thesis was to establish a pre-plan for the development of work safety policy for vocational education program in logistics. The vocational education sector operates in a safety critical environment where inexperienced students perform practical work procedures involving heavy equipment. Therefore, such organizations are required to manage occupational health and safety in a systematic manner and to develop a Safety Culture which supports such activities.

However, currently organizations operating in the vocational education sector are lacking such Safety Culture and a systematic approach to manage occupational health and safety. The absence of systematic management of occupational health and safety can be addressed by developing a pre-plan which determines the guidelines for safety management approach and safety policy.

The study was conducted by using existing knowledge on occupational health and safety guidelines, concepts of Safety Culture and Safety Management and how these entities can be implemented into organizational contexts. Qualitative case study research approach was used for this thesis to provide a linear process where the study is based on the findings of the previous sections.

A current state analysis was performed concerning the current challenges of the case organization in order to identify the key challenges and focus areas concerning safety matters. The current state analysis indicated that the case organization does not have a systematic way to define the roles and responsibilities of the key stakeholders in order to manage safety. Based on the key findings of the current state analysis, existing knowledge was studied to construct a conceptual framework for this thesis. The conceptual framework included Safety Culture, Safety Management and approaches to address these entities in safety critical organizations. The proposal draft was based on the key findings from the current state analysis and existing knowledge on how to ad-

dress these issues in a systematic manner. The proposal draft was validated by key stakeholders.

The final outcome of this thesis is a proposal for the establishment of a pre-plan for work safety policy. The proposal was designed as a table of responsibilities, order of implementation, schedules, audition, including a summary of pre-plan.

The proposal was built and validated in collaboration with key stakeholders of the organization and work safety authority. The proposal impacts the organization by determining the guidelines on how to commence the pre-plan for the development of work safety policy to establish an implementing tool for systematic approach towards occupational health and safety.

7.2 Practical/ Managerial Implications

The objective of this chapter is to describe the recommendations for actions in order to promote the establishment of the pre plan for the development of work safety policy. However, these recommendations are managerial guidelines which require the commitment and consideration of administration and management.

Firstly, the concept of Safety Culture should be emphasized on an administrative level in the case organization to support Safety Management by providing sufficient resources and administrative support and commitment from the top level of the organization.

Secondly, Safety Management should be implemented into the managerial activities of the case organization by providing adequate legitimate managerial jurisdictions towards the improvement of the current status of OH&S matters in the case organization and to put the OHSAS management approach into practice. Without legitimate managerial jurisdictions the OHSAS management approach cannot be put into practice convincingly.

Finally, the OH&S approach should be initiated in the case organization by establishing the procedures of the OHSAS management standard. The initiation requires the commitment of the administration and management to overcome the challenges of the operational activities such as the commitment of various stakeholders, change resistance and conceptions concerning the importance of the OH&S approach and OHSAS management standard.

By acting in this manner, a systematic approach towards the immediate activities is created to improve the status of the OH&S activities in the case organization.

7.3 Evaluation of the Thesis

This thesis was conducted in a structured manner as described in the research design. First, the objective of the thesis was defined. Second, the current state analysis of the case organization was conducted in order to create an understanding of the current procedures and challenges. The current state analysis was con-ducted in cooperation with the stakeholders and by analysing data such as group discussions, a video tape and internal documents concerning the current procedures and challenges. Third, existing knowledge concerning the key findings of the current state analysis was studied to create a conceptual framework. Fourth, the existing knowledge from conceptual framework was utilized to construct a proposal draft in co-operation of the key stakeholders. Fifth, the proposal was validated by collecting feedback and ideas from the key stakeholders resulting in the final proposal for the pre-plan for the development of work safety policy.

This thesis described a pre-plan for the development of work safety policy. The work safety policy involves the observation of various elements such as organizational factors, human factors and psychological dimensions. The implementation of work safety policy requires a comprehensive understanding of all these elements as well as understanding of Safety Culture, Safety Management and systematic practical implementations to put the work safety policy into practice in a safety critical organization.

7.3.1 Outcome vs. Objective

The objective of thesis was to establish a pre-plan for the development of work safety policy in the case organization. The outcome of this thesis was a pre-plan including guidelines, recommendations and actions to establish, implement and audit the development of work safety policy in the case organization. The pre-plan also included roles and responsibilities of key stakeholders, order of implementation, schedule of implementation and audition of implementation to fulfil the legislative and organizational requirements concerning the development of work safety policy in the case organization context.

7.3.2 Evaluation Criteria

The quality of research is determined by many factors. Some of the most significant of them include *relevance, logic, validity* and *reliability*. They are discussed below.

Validity in research involves topics such as neutrality and objectivity of the tool selection and data collection and analysis, as well as correctness of the interpretations and conclusions of the findings. *Validity* relates to establishing causal relationships where conditions lead to other conditions. (Yin 2009: 19-37) Validity can be assessed by evaluating the response to the measured research question. Valid research requires the use of multiple sources of data and reporting it in detail as well as using an external party to check the data. (Quinton and Smallbone 2006: 134-135)

In this thesis, for strengthening *validity*, the research needs to ensure the validity of this thesis by collecting data from official work safety authorities by Data Collection 2 as well as additional information from legislation and work safety material published by the work safety authorities. Moreover, the findings from the current state analysis are unknown at the beginning of the study and therefore the outcome of the proposal depends on the findings of current state analysis and prerequisites of the conceptual framework.

Reliability relates to the quality of the research process of the study which can be repeated with comparable results, where the later investigator should arrive at the same findings. The research is made as operational as possible by creating explicit documentation where all measurements, logic and findings are capable of being audited. (Yin 2009: 19-37) For strengthening reliability, the research needs to ensure gathering neutral, confirmable and applicable data from various sources. (Golafshani 2003: 602-604) Reliability can also be evaluated in terms of evaluating the quality of the academic research. The object of reliability is to minimize faults and biases. (Golafshani 2003: 601) Therefore, reliability is ensured by selecting, describing and following the appropriate methods and procedures suitable for a particular type of field and challenge.

In this thesis, *reliability* of research is ensured in terms of gathering neutral, confirmable and applicable data from various sources which can be evaluated from the viewpoint of the thesis. The trustworthiness of the data is evaluated in terms of applicability to com-

paring occurrences concerning work safety comparable organizations. In terms of ensuring the quality of the academic research, in this thesis, reliability is ensured by the methods and procedures described in Sections 2.2 and 2.3 where relevant and objective information is gathered from valid sources.

Next, in research literature, the concept of validity is described in terms of *relevance* and accuracy of research process and outcomes. *Relevance* is ensured by investigating real life business challenge. Relevance involves defining the objective of the research, investigating this matter with corresponding data and information where solutions are examined, explained, discovered and validated as a result this process. (Näslund D. et al. 2010: 334-338).

In this thesis, *relevance* is ensured, first of all, by following a strict research approach to the study. To ensure relevance of the problem to the case organization, the study, first, starts with specifying the objective of this research which arises from the activities of the case organization. Second, to ensure relevance of the outcome, the study starts by creating a step-by-step research design which determines the steps following each other in a relevant and logical manner. Next, to ensure relevance of respondents, key stakeholders and official authorities are chosen for sources of data and information.

Finally, this study pays special attention to ensuring *the logic* in selecting and building evidence and solution development. To ensure relevance, the study builds development ideas on the results of the literature search and the current state analysis of this thesis where the current strengths and improvement areas are evaluated by using key stakeholders of the organization as the source for Data Collection 1. Thirdly, data triangulation is utilized in conceptual framework where existing data and best practice information is gathered from multiple legit sources.

By acting in this manner, a logical chain of evidence is created for building the proposal based on the findings of the current state analysis, conceptual framework and key stakeholders of Data Collection 2. Finally, Data Collection 3 is utilized to validate the proposal in order to build a logical and valid proposal which can be implemented to the case organization and other corresponding contexts with similar qualities.

7.4 Final Words

Vocational education program in logistics operates in a safety critical environment where the demand for improved work safety is evident in the daily operations. This thesis has discovered that the establishment of work safety policy requires addressing the concepts of Safety Culture and Safety Management in order to identify a systematic approach towards the development of work safety policy. The successful implementation of a functional and appropriate work safety policy involves all levels of the organization from operational activities to management and administration where all key stakeholders realize the benefits of successful administering of work safety. The preplan can be considered as such approach to establish the necessary procedures for the development of work safety policy on all organizational levels.

References

Costella M.F., Saurin T.A. and Buarque de Macedo Guimarães L. 2009. A method for assessing health and safety management systems from the resilience engineering perspective. Safety Science. Vol 49. Available at: <http://www.resilience-engineering-association.org/download/resources/symposium/symposium-2006/Saurin_Costella_Guimaraes_text.pdf>. [25 January 2017]. p. 1056-1067.

Dasqupta Meeta. 2015. Exploring the Relevance of Case Study Research. Vision. Vol 19(2) Available at: <http://vis.sagepub.com/content/19/2/147.full.pdf+html>. [1 January 2017]. p. 147-160.

Demichela M., Piccinini N. and Romano A. 2004. Risk analysis as a basis for safety management system. Journal of loss prevention in the process industries. Vol.17. p.179-185.

Ferdinand Jaspers 2007. Case study research: Some other applications besides theory building. Journal of Purchasing and Supply Management. Vol. 13(3), 210-212. Available at: <http://www.sciencedirect.com.ezproxy.metropolia.fi/science/article/pii/S1478409207000957?np=y>. [9 February 2017].

Finnish National Agency for Education. 2011. Työssäoppiminen ja ammattiosaamisen näytöt ammatillisessa peruskoulutuksessa. Available at: <http://www.opetushallitus.fi/download/134243_Tyossaoppiminen_ja_ammattiosaamisen_naytot_ammatillisessa_peruskoulutuksessa.pdf>. [20 February 2017].

Golafshani Nahid. 2003. Understanding Reliability and Validity in Qualitative Research. The Qualitative Report. Vol. 8(4). Available at: <http://nsuworks.nova.edu/cgi/viewcontent.cgi?article=1870&context=tqr>. [8 December 2016]. p. 597-607.

Granerud, L. and Rocha, R.S. (2011) Organisational Learning and Continuous Improvement of Health and Safety in Certified Manufacturers. Safety Science, 49(7). Available at: <http://dx.doi.org/10.1016/j.ssci.2011.01.009>. [8 March 2017]. p. 1030-1039.

Johnson, Corinne. 2016. The benefits of PDCA. Quality Progress. Vol. 49(1). p.45
Makin A.L. and Winder C. 2008. A new conceptual framework to improve the application of occupational health and safety management systems. Safety Science. Vol 46. Available at: <https://pdfs.semanticscholar.org/0b24/be8e09d6677eddfc61bcb285286a0987bde2.pdf>. [15 March 2017]. p. 935-948.

Merriam Sharan. 2009. Qualitative research. A Guide to Design and Implementation. Jossey-Bass. Second edition.

Muñiz F., Montes-Peon J.M., and Vazquez C.J.-Ordas. 2007. Safety management system: Development and validation of a multidimensional scale. Journal of Loss Prevention in the Process Industries. Vol. 20. p. 52–68

Muñiz F., Montes-Peón J.M., Vázquez-Ordás C.J. 2009. Relation between occupational safety management and firm performance. Safety Science. Vol 47. Available at:

<http://www.sciencedirect.com/science/article/pii/S0925753508001951>. [15 March 2017]. p. 980-991.

Näslund D., Kale R. and Paulraj A. 2010. Supply Chain Management - A Framework for Relevant and Rigorous Research. Journal of Business Logistics. Vol 31(2).

Occupational Safety and Health Act. 2002. 23.8.2002/738.

Occupational Safety and Health Administration in Finland. 2010. Turvallisuusjohtaminen. Regional State Administrative Agencies. Available at: <https://www.tyosuojelu.fi/documents/14660/2426906/Turvallisuusjohtaminen_TSO_35.pdf/ef0c3554-4593-49d6-9530-64c28f404cb0>. [3 March 2017].

Opetushallitus. 2015. KOULUTUKSEN JÄRJESTÄJILLE KEINOJA PUUTTUA OPISKELUUN SOVELTUMATTOMUUTEEN Uudistettu opas SORA-säädösten ja -määräysten toimeenpanoon ammattikoulutuksessa. Oppaat ja käsikirjat 2015:12. Available at: <http://www.oph.fi/download/170668_koulutuksen_jarjestajille_keinoja_puuttua_opiskeluun_soveltumattomuuteen.pdf>. [10 March 2017].

Quinton, S. and Smallbone, T. (2006) Postgraduate Research in Business. A Critical Guide. Sage Publications.
Yin, R.K. (2009). Case Study Research: Design and Methods. 4th ed. Thousand Oaks, California: Sage Publications.

Reiman T., Pietikäinen E. and Oedewald P. 2008. Turvallisuuskulttuuri. VTT Publications. Available at: http://www.vtt.fi/inf/pdf/publications/2008/P700.pdf.
Risk evaluation at work sites. 2015. Ministry of Social Affairs and Health Finland.

Robson L.S., Clarke J.A., Cullen K., Bielecky A., Severin C., Bigelow P.L., Irvin E., Culyer A. and Mahood Q. 2007. The effectiveness of occupational health and safety management system interventions: A systematic review. Safety Science. Vol 45. p. 329-353

Vinodkumar M.N. and Bhasi M. 2011. A study on the impact of management system certification on safety management. Safety Science Vol 49(3).

Vecchio-Sadus A. 2007. Enhancing Safety Culture Through Effective Communication. *Safety Science Monitor*, Vol. 11(3). Available at: <www.monash.edu.au/muarc/IPSO/vol11/Issue3/2%20Vecchio.pdf>. [17 March 2017].

Appendix 1. Example Set of Field Notes (Data 1)

Research Interview (Discussion)

TOPIC: Case 'Work safety in Vantaa Vocational College Varia'

Information about the informant (Interview 1)

Table 1

Details	
Interviewers	Conducted by author.
Name (code) of the informant	Logistics teacher (Respondent 1)
Position in the case company	Logistic teacher
Date of the interview	28.11.2016
Duration of the interview	15min
Document	Field notes

Field notes (Interview 1)

Table 2

*** Think of formulating your own questions; these are suggestions for you to start**

	Topic(s) of the interview	QUESTIONS	FIELD NOTES
1	**Your experience on work safety**	How long have you worked as a teacher?	12 years in different vocational institutes
2	**Identify strengths/ problems**	What did you find to be the biggest strengths in Varia?	Good overall spirit at work among colleagues and good new equipment.
		How about where there some things that could have been done better?	Some colleagues are not very keen on helping others in certain things such as familiarizing each other with some machines, tools etc. I believe this is because they want to entitle this to themselves. We also have so many different items that one guy can't possibly know them all, at least very well.

3	**Key concerns**	What are your biggest concerns?	It's all about money these days and being productive. Not enough time to spend on familiarizing oneself to the machines and equipment beforehand and being afraid to ask. The student material has also gone down significantly during the past 5 years or so with very little knowledge about anything practical. The teaching has to begin with much more basic stuff than let's say 5 years ago. This is also a safety concern. They don't have a clue how to behave or act with tools/machines etc. Students of 15-18 years old are also very impatient and more focused on their smart phones and don't necessarily follow the teaching at all. Also, if they're away from the lesson they don't know what has been done or taught earlier and have gaps in their knowledge that I don't even know about. Then on the next lesson I assume that they know this stuff.
4	**Analysis**	Was something done differently compered to your previous employers in the education sector?	Not really, they didn't train me either before I started working. Just "welcome to work, here's your students, do something". Good thing with Varia is that now we have pretty accurate plans on what to do in each course compared to the old style where there was an open schedule without any specific subjects like we have today: automotive technology, forklift driving and so on.
5	**Best practice**	Do you have experience about best practice approach and if not, what would be the best practice approach in your opinion?	Not really, all industrial places where I've worked have had almost zero orientation. Of course it would be better if there was a period of let's say two weeks before each semester when we teach one another and familiarize the machines once again if we haven't used some particular machine for many months.
6	**Development needs**	What are your development ideas for future practices?	We should practice with machines and equipment each august before staring the work. But I'm afraid it's too expensive for the employer to do.

Appendix 2. Example Set of Field Notes (Data 1)

Video tape

TOPIC: Case 'Work safety in Vantaa Vocational College Varia'

Information about the informant (Video tape)

Table 1

Details	
Interviewers	Conducted by author.
Name (code) of the informant	First year logistics students (Respondent 2, Respondent 3 and Respondent 4)
Position in the case company	Student
Date of the interview	8.9.2016
Duration of the interview	10min
Document	Field notes

Field notes (Video Tape)

Table 2

FIELD NOTES
A group of first year students are practicing the use of a Linde E15 counterbalance forklift. One student sits in the forklift on the driver's seat while the instructor is stands outside the forklift on the left hand side right next to the driver. The forklift is in situated on an entrance to a large warehouse hall on dry tarmac surface. A group of 6 students are situated inside an empty semi-trailer which is on the right hand side of the forklift. All participants wear safety shoes and working overalls as well as reflective vests. Outside temperature is around +18 degrees Celcius. The driver of the forklift wear seatbelt and at this point all students have received basic familiarization with the equipment in question. The teacher has not been systematically familiarized with the forklift in question. He has over 30 years of experience of heavy machinery. The situation proceeds with the sudden movement of the forklift as the student gets accidentally confused with forward accelerator pedal and reverse pedal hence creating a situation where the stationary forklift moves suddenly backwards approximately 3 meters. While the forklift is moving, a student appears in the scene from outside the situation and walks directly behind the forklift. As a result, this person is run over by the forklift creating a situation where the left leg of the student is crushed under the rear wheel of the forklift. At this point the forklift has moved backwards approximately 3 meters and stops as the driver releases the reverse pedal.

After the impact, the forklift is driven forward by its driver and teacher calls paramedics immediately after checking the condition of the student. Paramedics arrive in 8 minutes during which the organizational administrator and the head of logistics department have also rushed to the scene.

Appendix 3. Example Set of Field Notes (Data 2)

Research Interview (Group discussion 1)

TOPIC: Case 'Work safety in Vantaa Vocational College Varia'

Information about the informant (Group discussion 1)

Table 1

Details	
Interviewers	Conducted by author
Name (code) of the informant	Organizational administrative manager (Respondent 5)
Position in the case company	Manager
Date of the interview	12.12.2016 and 23.1.2017
Duration of the interview	60min
Document	Field notes

Field notes (Group discussion 1)

Table 2

*** Think of formulating your own questions; these are suggestions for you to start**

	Topic(s) of the interview	QUESTIONS	FIELD NOTES
1	**Your experience on work safety**	How long have you worked in industrial contexts?	Since 1981 in garages, transport companies, industrial sites and past 10 years in Varia first as a teacher and then as a manager.
2	**Identify strengths/ problems**	What did you find to be the biggest strengths in Varia?	We have lot of opportunities to develop ourselves, the teachers have no economic strains such as selling goals to meet. They just have to teach as well as they can and make sure things are done safely and in a legit way.
		How about where there some things that could have been done better?	Some teachers are not very active in developing themselves or very interested in safety. Some even neglect safety issues or don't regard them as important. I have the time problem: very little time to manage or observe the situation or improve it. Most of the time is spent on administrative bureaucracy.

3	**Key concerns**	What are your biggest concerns?	Something happens: a student gets hurt and we don't have any metric to support the fact that the student has received any training on the matter. Also some teachers don't have the necessary skills to safely operate our equipment.
4	**Analysis**	Was something done differently compared to your previous employers in the logistics sector?	Not really, safety has been improved overall in the industry but schools are far behind on this. We don't have a systematic culture for safety or means to record what has been done, taught and by whom.
5	**Best practice**	Do you have experience about best practice approach and if not, what would be the best practice approach in your opinion?	Best practice would be a paper where each teacher tells which equipment he/she can operate and then sign this paper. This way I can wash my hands if this teacher does something wrong. The responsibility is then on him/her. The teacher should also have records of what each student has been taught so that he/she can wash his/her hands if the student does something against teacher's instructions.
6	**Development needs**	What are your development ideas for future practices?	We need to create a system for best practice approach. As far as I'm concerned the Headmaster does not have a thorough idea of the concerns that we have here in safety issues even though his actions are the ones that are examined very thoroughly if something happens. We must have the correct measures and resources to carry out safety culture and improve safety in our organization but so far this relies only on our own activeness and the top level organization does not help us at all in this. I've sent the headmaster an e-mail where I tell about my concerns in this case. I haven't received any response to that message but I think it'll cover our back if something goes wrong and the investigation starts.

Appendix 4. Example Set of Field Notes (Data 3)

Research Interview (Group discussion 2)

TOPIC: Case 'Work safety in Vantaa Vocational College Varia'

Information about the informant (Group discussion 2)

Table 1

Details	
Interviewers	Conducted by author
Name (code) of the informant	Organizational administrative manager (Respondent 5), Work safety authority (Respondent 6) and Head of department (Respondent 7).
Position in the case company	Respondent 5 as administrator, Respondent 6 as expert and Respondent 7 as manager.
Date of the interview	12.2.2016 and 23.3.2017
Duration of the interview	240min + 240min
Document	Field notes

Field notes (Group Discussion 2)

Table 2

*** Think of formulating your own questions; these are suggestions for you to start**

	Topic(s) of the interview	FIELD NOTES
1	**How the proposal can be implemented, utilized and further developed to suit the case organization?**	Work safety authority The pre-plan can be implemented in the case organization and is advanced considering the educational sector context in general. Special attention should be given to the roles and responsibilities of each key stakeholder and the documentation of the responsibilities. Another significant factor is the regularity of planning where the risks are identified and corrective measures are chosen. The immediate priority in your organization is to have a basic system with basic requirements which can be developed over time.
		Organizational administrative manager A significant amount of resources has been utilized for the development of the pre-plan and it has benefited the organization in improved procedures for risk identification, for providing documentation of the measures that have been taken as well as for identifying the roles and responsibilities for each key stakeholder. The challenge here is the active maintenance of the commitment towards the occupational health and safety.

		Head of department: The challenge for the implementation of the proposal will be the change resistance and management of change within the department. The work has to be done step by step so that the whole process proceeds systematically and the employees see the benefits of the change.